Environmental Scan of Primary Care-Based Efforts To Reduce Readmissions

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Executive Summary

Research from the Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project (HCUP) indicates high rates of readmissions in the Medicare population and among the adult, non-obstetric Medicaid population.[1] These high rates of readmissions are associated with problems such as prescribing errors and misdiagnoses of conditions in the hospital and ambulatory care settings.[2] Many efforts to reduce readmissions have focused on the hospital setting and staff using evidence-based programs, such as AHRQ's RED (Re-Engineered Discharge) toolkit,[3] the Care Transitions Intervention,[4] and *The Hospital Guide to Reducing Medicaid Readmissions*.[5]

The evidence-base for the primary care setting on how to reduce readmissions and improve patient safety is comparatively lacking. This gap in the literature is becoming more pronounced as primary care is increasingly called to serve as the key integrator across the health care system as part of payment and delivery system reforms.

To address this gap, AHRQ funded [research](#) on what is currently known about reducing readmissions from the primary care perspective. This environmental scan examines what is currently known about reducing readmissions from the primary care perspective by analyzing the findings of 42 peer-reviewed articles and 30 items from the gray literature.

Key Findings

- The primary care-based literature on care transition programs is less developed than the hospital-based literature. In addition, the diversity of primary care settings makes the implementation and impact of interventions vary, so context is essential to understanding this literature.

- Multi-component interventions that addressed multiple challenges of patients and providers tended to be more effective than individual interventions. Care transition programs in the context of more general primary care transformation efforts, such as the patient-centered medical home, also tended to be more effective.

- Much of the research was conducted in large academic health centers, which may not be generalizable to independent primary care practices.

Future Considerations for Stakeholders

- *Primary care clinicians and health system leaders*: The literature demonstrates some effective approaches in which clinics played a significant role in reducing readmissions; some tools and resources are shared in Table 9. Collaborating with hospitals to define care coordination responsibilities will help align care transition programs in both settings and reduce redundancy.

- *Policymakers*: Many care transition programs identified in this scan were funded by grants or other temporary funding mechanisms. Financial arrangements that align primary care and hospital incentives, such as shared savings programs and managed care contracts, may facilitate integration and sustainable improvements.

- *Researchers*: Further research is needed on primary care-based care transition interventions, especially in independent primary care settings. Attention should also be paid to developing low-cost models that build on existing infrastructure, diversity of primary care settings, and interdependencies of care coordination activities both in and out of the primary care setting.

Introduction

Each year in the United States more than 35 million patients are discharged from the hospital.[6] The 30-day period immediately after hospital discharge has proven to be a particularly vulnerable time for patients. In the Medicare fee-for-service population, approximately 18 percent of discharged patients will be readmitted to a hospital facility within 30 days,[7] and among the adult Medicaid population the rate is even higher.[8, 9] Readmissions have profound consequences, costing Medicare tens of billions of dollars and leading to delays in clinical recovery.[10]

Because the peri-discharge period is fraught with risks, considerable attention has been focused on improving care coordination during this high-risk time. To date, the primary focus has centered on hospital-based interventions to improve care for discharging patients. High-quality controlled studies have demonstrated the benefits of specific protocols hospitals can implement in reducing readmission rates and improving patient outcomes, although not all these programs have been successful.[11] The most successful of these programs have been bundled interventions that involve both the pre-discharge and post-discharge periods and offer "bridging" services to improve communication between the inpatient and outpatient settings.[12]

With widespread uptake of these programs by hospitals nationwide—in part driven by penalties to hospitals with high readmission rates through the Hospital Readmissions Reduction Program[13]—hospital readmission rates are declining but still high.[14, 15] These findings are encouraging but underscore the opportunity for further progress. Despite the concerted national efforts resulting from the Hospital Readmissions Reduction Program, an estimated 27 percent of hospital readmissions may still be avoidable.[16,17]

It is unclear why care transition efforts to date have not been able to more substantially affect readmission rates. One reason, however, may be that much of the focus of care transition efforts has centered on hospital-based programs. Yet hospital providers may only have a limited ability to affect what occurs once the patient has left the hospital. Hospitals will often schedule a post-discharge follow-up appointment with the patient's primary care provider, but much less is known about the role of primary care clinics in the care transition process. Primary care providers generally resume care for patients after

discharge[18] and providers and staff often have longstanding, trusted relationships with their patients.[19] Increasingly, primary care clinics are also assuming the role of care integrators as part of patient-centered medical home (PCMH), accountable care organization (ACO), and other team-based approaches to improving care.[20] Thus, it seems intuitive that primary care clinics would play a critical role in improving care transitions.

The evidence-base for the primary care setting on how to reduce readmissions and improve patient safety is comparatively lacking. To address this gap, AHRQ funded research on what is currently known about reducing readmissions from the primary care perspective. The environmental scan examines what is currently known about reducing readmissions from the primary care perspective with a focus on evidence of successful practices.

It can be difficult to delineate the most effective role of primary care in care transitions as patients require varied services – such as medication reconciliation, transportation assistance—at various times ranging from hospitalization to health management at home. The characteristics of different primary care practices—such as their infrastructure, staffing, and payment model—can greatly affect the extent to which they can support effective care transitions. Primary care may play a small to large role in care transition interventions, and the complexity of these interventions can vary greatly depending on circumstances in their health system environment and relations with other health system members.

Further complicating the concept of what a primary care-based transitional care intervention may be is that interventions may be initiated, delivered, or staffed by different parties. For instance, a health plan may staff care navigators in a primary care practice for complex care patients, and these care navigators may visit the patients in the hospital if they are admitted. Alternatively, a hospital may staff a care navigator from a local primary care practice as a liaison for hospitalized complex care patients as part of a warm handoff. In both cases, a care navigator meets the patient face to face to assist in the care transition, but different people may play the roles in different settings.

This environmental scan offers a targeted review of transitional care interventions in which primary care plays a significant role. These care transition programs are labeled as primary care-based with the recognition of the complexities of this term as described above. Transitional care interventions that link to primary care as a passive recipient have been excluded from this review. Given the vast array of transitional care interventions in health care and the different people involved, there are limitations to the search terminology used for this scan. The absence of articles that use different language, such as "*primary care redesign*" or "*patient centered medical home and care coordination,*" reflects methodological limitations rather than articles' lack of relevance.

First, the environmental scan examines the barriers and challenges patients face in receiving appropriate and timely care from their primary care providers after discharge. Next, there is a summary of different primary care-based strategies aimed at reducing readmissions in different settings. Finally, it concludes with considerations for primary care

clinics hoping to improve care for their patients at the time of hospital discharge, suggests directions for future investigation, and discusses implications for policymakers.

Methods

A search for the relevant medical literature was conducted using the PubMed, Ovid, and Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases for the terms *primary care* and *patient centered medical home* in combination with each of the terms *readmission*, *care transition*, and *hospital discharge*. The searches were limited to English-language articles published since 2006 through November 2016.

This 10-year span was selected to capture articles from the health reform discussion before passage of the Patient Protection and Affordable Care Act (ACA), which was characterized by more piecemeal approaches to improve care transitions. The debate and then the passage of the ACA spurred a large increase in efforts to reduce avoidable readmissions, including Medicare penalties. The timeframe of this search therefore should encompass publications on care coordination improvement efforts in the post-ACA environment and a few years preceding it.

Reviewers excluded articles that were duplicates, had an international focus, focused solely on the pediatric population, did not focus on primary care, and were opinion articles. This resulted in 42 articles met the inclusion criteria for this review. The articles were sorted by thematic similarity based on the abstracts, and then reviewers refined the categorization based on a full reading of the articles. The data were abstracted using a template to collect the following key elements from the articles: keywords, type of study, problems/barriers identified, intervention/strategy used/recommended, providers involved, study population and number of subjects, research setting, methods, results, and AHRQ involvement.

Given the still emergent literature on ambulatory programs aimed at reducing readmissions, this environmental scan also includes a brief review of "gray literature" to find information on efforts that may not be found in peer-reviewed literature. A search was conducted for the same set of keywords on a set of Web sites: ahrq.gov, innovations.ahrq.gov, innovations.cms.gov, google.com, and rwjf.org. The first 50 search results on these Web sites were examined for relevance to this review. The gray literature items were then categorized based on similarity of content—emerging practices versus tool—and relation to the peer-reviewed literature.

Results

The peer-reviewed literature search yielded: 535 articles. The authors reviewed 42 articles on primary care and readmissions and related terms that met the inclusion criteria with about one-third of these articles focused on describing the different problems and challenges in care coordination. Four articles examined the efficacy of primary care follow-up visits on reducing readmissions.

The remaining 23 articles described the results of different types of interventions. The interventions reviewed were grouped into several categories:

- Primary care automated alerts when patients are hospitalized,

- Early identification of post-discharge complications,

- Medication management, and

- Bundled care coordination interventions.

Most of these articles discussed bundled care coordination interventions and were further organized based on similarities. Fifteen links in the gray literature met the same inclusion criteria as the peer-reviewed literature. The reviewers then categorized the gray literature content according to the classification developed for the peer-reviewed articles.

The results for the literature review are organized as follows:

- Challenges to care coordination;

- Effectiveness of the primary care visit;

- Individual care coordination interventions:

  o Primary care automated alert when patients are hospitalized;

  o Early identification of post-discharge complications; and

  o Medication management.

- Bundled care coordination interventions:

  o Interventions implemented in large academic medical centers;

  o Care transition programs in independent primary care practices; and

  o Readmission reduction efforts led by payers.

- The patient-centered medical home and care coordination; and

- Integrating hospital and primary care-based efforts.

Tables are included in the results to summarize the challenges to care coordination, tools and resources found, and the key information from intervention studies. Not all of the topics listed had relevant gray literature content; only topics with relevant gray literature have a specific subsection that reviews gray literature content.

Challenges to Care Coordination

Fourteen peer-reviewed articles had a primary focus of describing the barriers to effective care transitions from the hospital to the primary care setting. The studies used a variety of methods—such as questionnaires, interviews, focus groups, and literature reviews—to examine barriers from the provider and patient perspectives.

Four studies explored care coordination challenges providers perceive,[21,22, 23,24] and two studies did so from the patient perspective.[25,26] Four studies examined the challenges of coordinating between providers, specifically the discharge summary, handoffs, and perceived capabilities of specialists and primary care providers.[27,28,29,18,30] Several studies examined specific issues related to care coordination difficulties; namely, two studies focused on the types and frequency of medication-related issues,[31,32] and two studies described providers' perceptions of health information technology (HIT). [33,26] The studies differed in settings in which they were conducted, populations studied – such as Medicare and Medicaid—and stage in the care transition process.

Table 1 provides a summary of barriers in four categories: system, organizational, provider, and patient. Nearly all the articles described system- level barriers such as fragmentation of the care system, financial disincentives, and regulatory barriers that prevented more effective coordination between inpatient and primary care providers during the care transition process. Several studies documented a lack of health insurance coverage for transportation to follow up appointments or for needed medications.

Related barriers exist at the organizational and provider levels. Hospitals and primary care practices often lack standardized processes or workflows to manage the care transition process, including:

- Timely transfer of discharge summary,

- Follow-up phone calls,

- Patient education and engagement strategies, and

- Referral and follow-up to social services to address nonmedical needs.

One particular challenge identified by Armor was the high rate of adverse drug events and lack of systematic medication reconciliation after hospital discharge.[31] Other studies also noted that medication reconciliation was a key priority for primary care after hospital discharge. These organizational issues at the hospital and primary care levels are reflected in the barriers reported by individual primary care providers (PCPs), such as:

- Lack of time,

- Competing priorities,

- Lack of information on hospitalizations and timely discharge summaries, and

- Medication discrepancies.

In addition, some PCPs reported "feeling undervalued when hospitalists made medication changes without involving PCPs." [26]

One important limitation of the literature is that very few studies examine the perspective of providers other than hospitalists and PCPs, despite the fact that numerous other providers play increasingly important roles; these include nurses, pharmacists and pharmacy technicians, mental health providers, social workers, and community health workers.   .

Table 1. Challenges to Care Coordination Described in the Literature

System	- Lack of financial incentives and payments for care coordination; - Regulatory barriers to information sharing; and - Lack of reimbursement for nonmedical services.
Organizational	- Lack of ability of electronic health records to communicate; - Lack of standardized process for improving care transitions; - Inadequate financial resources; - Inadequate workforce for care coordination such as care coordinators; - Insufficient communication across settings; and - Inadequate coordination with PCMH practices.
Provider	- Lack of time and competing priorities; - Lack of information on hospital experience and treatment; - Medication discrepancies; - Lack of communication between inpatient and outpatient providers; and - Inadequate communication with providers from other setting such as home care, community mental health, and aging services.
Patient	- Medication problems or errors; - Hospital complications; - Difficulty reconciling follow-up care with patients' life priorities; - Difficulty scheduling follow-up appointments with PCP and tests; - Confusion regarding how to translate knowledge into health- promoting actions at home; - Lack of support to address nonmedical needs such as nutrition, housing, transportation, and safety; - Financial barriers to receiving follow up care; and - Lack of participation of caregivers in discharge planning and follow up care.

In the studies reviewed for the scan, patients expressed some similar concerns about care transitions and patient safety but described them in different terms and had different priorities than primary care providers. In addition, patients experienced: medication problems and adverse events, issues with follow-up appointments or tests, difficulty

making recommended lifestyle changes, inattention to nonmedical needs, and hospital complications.[25]

In one study, patients were twice as likely to report a problem if their PCP was unaware of their hospitalization. In contrast, an in-depth anthropological study conducted at Kaiser found other important patient concerns that were not identified in other studies. These included making caregivers part of every step of the transition process, feeling connected to and trusting providers, and transitioning from illness-defined experience to "normal" life.[26]

Nearly all the studies described system-level barriers and regulatory obstacles that prevented more effective coordination. This scan also suggests that the nature and level of organizational barriers appears related to whether the primary care clinics are part of larger more organizationally and financially integrated systems. Studies in more integrated systems reported fewer and less severe problems. In addition, it is not well characterized in the literature is the effect of different patient populations on the challenges to care coordination. Another important gap in the literature is the relative lack of studies documenting patient and family care perspectives; this is a critical issue given the emerging evidence that patients and their families have different priorities and use different language to describe care transitions. The articles describing challenges to care coordination tend to share many similar findings. However, there is more variation among primary care-initiated interventions as a means to address these challenges.

Effectiveness of the Primary Care Visit

For primary care to play a role in reducing readmissions, patients need to see their primary care doctor in a timely follow-up visit after hospital discharge. In this review, three observational studies assessed the effect of a timely follow-up visit, without the benefit of other care enhancements, on 30-day readmissions. These articles arrived at divergent conclusions, perhaps due to their differing methods, measures, and settings.

Peer-Reviewed Literature

In the first article, Field found that an office visit with a PCP or specialist within seven days of hospital discharge yielded no protective effect on 30-day rehospitalizations among patients 65 and older in a large multispecialty group practice.[34] In contrast, Misky found that among a small convenience sample of patients discharged from an internal medicine ward , patients who lacked an office visit with a PCP or specialist within four weeks were 10 times more likely to be readmitted within 30 days for the same condition than patients who had a timely follow-up visit.[35]

Finally, Lin conducted a retrospective analysis of a nationally representative sample of elderly, community-dwelling participants in the traditional fee-for-service program using Medicare Current Beneficiary Survey data. In this study, physician follow-up—irrespective of timing—was significantly negatively associated with 90-day readmissions. In addition, having a follow-up visit was associated with approximately $10,000 lower annual health expenditures.[36]

Summary

Although there is much potential discussed with regard to the role of primary care in reducing readmissions, the evidence linking the timely follow-up visit on its own to readmission reduction seems mixed. These studies differed in their patient populations, operationalization of the follow-up visit, and definition of the readmission outcome. In addition, there were differences in patient medical condition, education and support. Finally, closer consideration of particular primary care-based care coordination activities is warranted to better understand the mechanisms through which primary care may reduce readmissions.

Individual Care Coordination Interventions

The remaining studies in this scan examine the impact of different primary care-based interventions on reducing readmissions. The following sections on primary care automated alerts, early identification of post-discharge complications, medication management, and bundled care coordination interventions describe the literature on other primary care-based readmission reduction efforts.

Primary Care Automated Alerts When Patients are Hospitalized

The awareness of PCPs' on their patients' hospitalization varies, with some studies showing roughly 20 to 30 percent of PCPs being unaware of their patient being hospitalized.[25, 30] Timely notification of hospitalization is important so that PCPs have a chance to communicate with hospital teams and ensure that care coordination can occur smoothly. The reliability of this notification in terms of how often it occurs, from which hospitals and to which primary care staff members, what information the notification includes, and the extent to which it integrates with care coordination activities has implications for the quality of patient care. The prevalence of automated alerts varies widely by primary care setting.

Peer-Reviewed Literature

In Table 2, two articles tested the impact of integrated IT systems that notified primary care staff when their patients were hospitalized. Gurwitz conducted a randomized controlled trial that used IT to enhance the information available to the PCP at follow up visits. They used automated alerts to PCPs and staff when older adults were discharged from the hospital.[37]

This electronic health record (EHR)-based transitional care intervention also provided:

- Information about drugs added during the inpatient stay,

- Warnings about drug-drug interactions,

- Recommendations for dosage changes and laboratory monitoring of high-risk medications, and

- Alerts to the PCP's support staff to schedule a post-hospitalization office visit.

The intervention did not have an impact on timeliness of PCP office follow-up visits or readmissions. The authors note that the success of the system requires a high level of responsibility and accountability on the part of the PCP and staff and that other factors such as too many alerts competing for attention can limit the effectiveness of EHR-based interventions.

In the second article by Moran, four prototype programs were described in which automated notification of primary care staff was used to ensure appropriate follow-up and coordination of care.[38] These automated systems used a secure online Web site or an encrypted email notification system to alert clinicians and practice staff to hospital registration of the patient. In each program, notification triggered a nurse-directed clinical assessment and care coordination plan and helped ensure timely primary care follow-up.

Although some of the programs demonstrated reduced hospitalizations, no data were shared regarding readmission rates. Still, the authors conclude that automating the notification of PCPs and practice nurses is a potent and vital tool to improve care coordination, and primary care follow-up is an essential tool for the PCMH model. The authors note that the effectiveness of automatic notification programs would depend on the accuracy of the data, ability to assign a PCP, availability of resources to coordinate care, and effectiveness of program interventions.

Table 2. Primary Care Notifications When Patients Are Hospitalized

Article	Setting	Intervention	Outcomes
Gurwitz J, Field T, Ogarek J, et al. An electronic health record-based intervention to increase follow-up office visits and decrease rehospitalization in older adults. J Am Geriatr Soc 2014;62(5):865-71.*	• Large multidisciplinary group practice • Patients at least 65 years old discharged from hospital to home • Intervention group N=1,870 and control group N=1,791	• Study design: randomized controlled trial. • The EHR-based transitional care intervention provided: 1. Notification of patient discharge; 2. Information electronically about drugs added during the inpatient stay; 3. Warnings about drug–drug interactions; 4. Recommendations for dosage changes and laboratory monitoring of high-risk medications; and 5. Alerts to the primary care provider's support staff to schedule a post hospitalization office visit.	• No significant impact on the timeliness of primary care provider office follow up visits or 30-day readmissions.
Moran W, Davis K, Moran T, et al. Where are my patients? It is time to automate notification of hospital use to primary care practices. South Med J 2012;105(1):18-23.	• Four clinical programs in North and South Carolina targeting asthma, Medicaid patients, complex older patients, and preterm delivery prevention • Patients enrolled in these programs; N=3,271 to 44,879	• Study design: case studies. • The care coordination software Disease Management Network (DMCN) housed a database that linked all patients to at least one primary care provider; hospital admission-discharge transfer (ADT) transactions sent to the DMCN automatically sent push notifications to primary care providers. • All of the programs initiated a care coordination telephone call in response to emergency department visits and hospitalizations within 24 hours when possible to: assess whether the patient was clinically stable, needed help acquiring prescribed medications, or needed assistance setting an appointment with his or her primary care provider	• Hospitalizations were reduced in asthma and preterm delivery programs, but readmission rates are not shared in this paper

∗ *This study was funded by AHRQ.*

Summary

With only two studies identified in the literature on the effectiveness of automated alerts, it is not possible to draw conclusions about how they may affect readmission rates. The studies identified many factors that make automated alerts difficult to implement and integrate into care, such as the variability in the accuracy of data and staff accountability in using these alerts.

In addition, it is unknown what other care coordination-related activities were concurrent with these studies, so it may be difficult to isolate the utility of automated alerts alone. It is also unknown to what extent the findings here would apply to different types of primary care practice settings. More research is required to understand the effectiveness of automated alerts in different contexts such as different primary care settings, bundled with

various primary care-based readmission reduction efforts, and ways alerts are integrated into practice.

Early Identification of Post-discharge Complications

Some primary care efforts to reduce readmissions have focused on early recognition of medical problems in patients after they have been discharged from the hospital. The studies that attempted to identify early discharge complications in the outpatient setting all included post-discharge phone calls as their primary intervention. There were three peer-reviewed studies, including one review article, where the primary aim was to identify post-discharge complications in patients; see Table 3. A variety of outcomes were measured including the number of post-discharge problems identified, primary care follow-up rates, and readmission rates.

Peer-Reviewed Literature

In the first study, Crocker, conducted a systematic review of effects of primary care-based telephone follow-up interventions on post-discharge emergency department (ED) visits, hospital readmissions, and primary care engagement.[39] Three controlled studies were identified in this review; two occurred in community teaching hospitals and one was at a Veterans Affairs medical center. In all three studies, the phone calls were made by nurses or nurse care managers who conducted a needs assessment and medication review and confirmed or scheduled follow up appointments after discharge. Two of the interventions included assessing barriers to keeping appointments.

None of the studies reported a statistically significant impact of the telephone intervention on hospital readmission rates and the two that examined ED utilization did not show an impact either. However, all three studies reported improved post-discharge primary care contact. The review also noted that only one of the studies provided the telephone follow-up script, making it difficult to compare content and determine the pertinent components of the follow-up calls.

The two other articles identified in this environmental scan were published after the systematic review was conducted. A study by Tang focused on conducting a descriptive study measuring symptoms, follow-up appointment attendance, and 30-day readmission among patients receiving post-discharge phone calls from RNs embedded in a primary care practice.[40] The nurses were trained in problem-solving techniques to address issues that could arise and appropriate triage, and attempted to contact patients within 72 hours of discharge. In addition, they used structured scripts for the calls to ask about worsening symptoms and home care needs. Medication reconciliation was also done unless this was perceived to be too complex, in which case it was conducted in person.

At least one problem was noted in 76 percent of completed calls. The number of completed follow-up appointments were higher among patients who received fully scripted calls or messages compared with unreachable patients. However, readmission rates were not significantly different for the groups. Also, there was no detected difference in patient characteristics between the patient groups or explanations for why some patients were

unreachable. It is possible that patients who were unreachable were able to leave their homes since they were healthier which may have mitigated the results of the study.

Table 3. Early Identification of Post-discharge Complications

Article	Setting	Intervention	Outcomes
Crocker J, Crocker J, Greenwald J. Telephone follow-up as a primary care intervention for post-discharge outcomes improvement: a systematic review. Am J Med 2012;125(9):915-21.	• Adult primary care settings, including community teaching hospitals and a Veterans Affairs medical center, from three studies (systematic review) • N=a combined 1,765 patients over three studies	• Study design: systematic review of randomized controlled trials. • Primary care- based telephone follow-ups administered by RN, generally within 1 week of discharge. • Calls included needs assessment, education, symptomatic review and follow-up, medication review, and appointment confirmation.	• None of the studies demonstrated evidence of reduced admissions or emergency department visits. • All three studies reported improved post-discharge primary care contact as a result of telephone follow-up.
Tang N, Fujimoto J, Karliner L. Evaluation of a primary care-based post-discharge phone call program: keeping the primary care practice at the center of post-hospitalization care transition. J Gen Intern Med 2014;29(11):1513-8.	• Academic medical center in California • N=790 adults being discharged who had a primary care provider at that same medical Center	• Study design: quality improvement. • Embedded RNs in a primary care practice called patients within 72 hours of hospital discharge. • Calls were scripted to ask about worsening symptoms and home care needs and to perform medication reconciliation.	• RNs were able to reach more than 90% of discharged patients. • About three-quarters (76%) of RN calls identified at least one issue, 47% of which included medication issues and 25% of which included new symptoms. • Completed follow-up appointments were higher among patients who received full calls and messages, compared with patients who could not be reached (60.1% and 58.5% vs. 38.5%, p<0.004) • No significant difference in readmission rates
Graham J, Tomcavage J, Salek D, et al. Post-discharge monitoring using interactive voice response system reduces 30-day readmission rates in a case-managed Medicare population. Med Care 2012;50(1):50-	• A physician-led health care system in Pennsylvania. • Participants included Medicare Advantage members who had at least one hospital admission in 2009, were case managed, and were considered high-risk. • intervention group N=875 and control	• Study design: quasi-experimental. • All study participants received case management, but intervention patients were supported by a tele monitoring interactive voice response (IVR) support system, which automated 4 weekly calls in 30 days that alerted case managers via EHR if patients needed further follow-up.	• The use of IVR with case management was associated with a 44% reduction in 30-day readmissions in the study cohort (p=0.0004).

In the last article by Graham, a pre-post quasi-experimental design to examine the effects of a post-discharge interactive voice response (IVR) tele-monitoring system.[41] The intervention included weekly automated phone calls for four weeks that alerted case managers in real time via the EHR records if patients needed further follow-up based on their responses. The IVR system would automatically retry phone calls at set intervals if there was no response, case managers enrolled select patients into the IVR group who were Medicare Advantage patients from an active case management program at a PCMH clinic and were deemed to be at high risk for readmissions. Completed IVR call rates were not reported.

Thirty-day readmission rates were compared for members who did and did not experience the automated calls before and after the program was implemented. Compared with the control group, who just had case management, there was a 44 percent reduction in 30-day readmissions in the intervention group.

Summary

All the studies identified that address post-discharge complications used post-discharge telephone calls—either automated or made by nurses or care managers. These interventions included: medication reviews or reconciliations, needs assessment, and evaluation for follow-up appointment; however, little information was provided on the details of the call scripts.

Most of the studies demonstrated no impact on readmission or emergency room visits. This is in keeping with the findings of another systematic review of hospital-based telephone follow-up interventions, which generally found no statistically significant differences between telephone follow-up and control groups.[42]

The only study showing a decrease in readmissions was unique in that it used an automated voice recognition system in addition to a care manager and repeated calls were made to patients as opposed to a single call. However, the studies demonstrated other outcomes important to patient care—most notably identification of needs and improved primary care follow-up.

Efforts to identify post-discharge complications early in the primary care setting could benefit from further research on the quantity, frequency, method—phone call versus automated call versus face-to-face or home visit, and content of interventions most likely to prevent readmissions. Future studies on telephone follow-up should report the proportion of patients they were able to reach in intervention groups, as the effects from the reviewed studies may have been minimized due to inability to reach some patients.

While there may be a modest benefit on readmissions and other patient-centered outcomes in attempting to identify post-discharge complications via telephone interventions, this method is likely to be most effective in an integrated system that includes other elements of care redesign.

Medication Management

Evidence suggests that adverse events related to medications are a significant problem in patients discharged from the hospital[43] and that patients receive inadequate assistance with managing their medications in the post-discharge setting.[44] The period after discharge for patients is a critical time when changes in medications, adverse reactions, medication availability, patient education, and financial barriers can be easily overlooked. Furthermore, addressing these issues can be challenging for primary care providers who cite barriers such as competing interests and inadequate discharge information.[45]

Peer-Reviewed Literature

Three peer-reviewed articles described studies that specifically aimed to address medication management in the primary care setting after hospital discharge; see Table 4. In all three studies, the intervention involved either phone calls or face-to-face visits with clinical pharmacists. While other studies involving nursing interventions have included medication reconciliation, these studies also included non-medication-related post-discharge questions. In addition, the medication reconciliation were not consistently carried out during every post-discharge patient interaction. Given that medication management was not the primary focus of those studies, they were not included in this section.

Table 4. Medication Management

Articles	Setting	Intervention	Outcomes
Tedesco G, McConaha J, Skomo M, et al. A pharmacist's impact on 30-day readmission rates when compared to the current standard of care within a patient-centered medical home: a pilot study. J Pharm Pract 2016 Aug;29(4):368-73; Epub 2015 Jan 28.	• Two large primary care physician practices in Pennsylvania. • Patients with Medicare discharged from a select hospital. • Intervention group: N=34 patients at one site; control group: N=43 patients at another site.	• Study design: nonrandomized controlled trial. • Pharmacist telephoned patients after hospital discharge to perform medication reconciliation, answer questions, and attempt to schedule an in-person follow-up appointment. • Additional face-to-face visits occurred for 16 of the 34 intervention patients. • Pharmacists had access to discharge hospital electronic medical record (EMR).	• No significant difference in 30-day readmission rates between the control and intervention groups (26.7% vs. 14.7%; p=0.27). • Near significant decrease in readmission rates for patients who interacted with the pharmacist face to face versus only via telephone (16% vs. 27.8%; p=0.05).

Articles	Setting	Intervention	Outcomes
Kilcup M, Schultz D, Carlson J, et al. Post-discharge pharmacist medication reconciliation: impact on readmission rates and financial savings. J Am Pharm Assoc 2013;53(1):784.	• Nonprofit integrated group health plan practices with a PCMH design in Washington State. • Patients identified as high risk for readmission. • Intervention group: N=243 patients at clinic sites offering clinical pharmacist assessments; control group: N=251 patients at clinic sites not offering clinical pharmacists.	• Study design: nonrandomized controlled trial. • All patients received post-discharge calls from nurses to screen for red flags and review follow up plans. • The intervention group received calls from pharmacists who conducted a medication therapy assessment and discussed any changes with the patient. Information was sent to the primary care provider via the EMR. • Pharmacists also had access to patient's discharge summaries and current outpatient medication lists.	• Eighty percent of patients in the intervention group had at least one medication discrepancy on discharge. • The intervention group had decreased readmission rates at 7 days (0.8% vs. 4%, p= 0.01) and 14 days (5% vs. 9%, p= 0.04), but not at 30 days (12% vs14%; p= 0.29). • Financial savings per 100 patients who received medication reconciliation was ~$35,000.
Smith M, Giuliano M, Starkowski M. In Connecticut: improving patient medication management in primary care. Health Aff 2011;30(4):646-54.	• Four federally qualified health centers in Connecticut. • Patients with Medicaid with one or more chronic conditions and taking three or more medications. • Intervention group N=88 patients and control group=0.	• Study design: pre-post health care-cost analysis. • At these appointments, pharmacists identified drug therapy problems and worked to resolve these problems with the retail pharmacist and prescribers. Pharmacists had access to the outpatient EMR • Patients were eligible for up to six appointments with a pharmacist at monthly intervals in their primary care office; average of 4.6 encounters per patient over 11 months	• Pharmacists identified an average of 10.4 drug therapy problems per patient and resolved 80% of them. • In the 12 months before the intervention, total health care costs—including readmissions, all medical, hospital, pharmacy, and ED expenses—were $574,817 compared with an extrapolated annual cost of $434,465 during the intervention, an annual savings of $1,123 per patient on medication claims and $472 on acute care expense

The most recent study by Tedesco was a small, nonrandomized controlled trial examining readmissions in patients undergoing a phone and then face-to-face encounter with a pharmacist.[46] Pharmacists attempted to contact patients with Medicare within 3 days of their discharge via phone to perform medication reconciliation, which included reinforcing hospital instructions, ensuring patients understood how to take and obtain all their medications, and stressing the importance of continuing their medications. Pharmacists then attempted to schedule the patients for a face-to-face visit—usually just prior to their primary care follow-up—where similar medication issues were addressed. Thirty-day readmission rates were compared with a control group of demographically similar patients with Medicare at a different sit

There was no difference in the percentage of patients readmitted in 30 days between the control and intervention groups. However, patients who had an additional in-person meeting with the pharmacist had near statistically significant lower readmissions rates than those who only completed a call with the pharmacist which is notable given the small sample sizes.

Kilcup conducted a similar study at an integrated group health plan's practices with a PCMH design, and it was a larger, nonrandomized controlled analysis measuring the effects of a post-discharge pharmacist phone encounter on readmission rates.[47] In this study, nurses made post-discharge calls to patients who were determined to be at a higher risk for readmission in both the intervention and control group. During the calls, nurses screened patients for red flags, reviewed follow-up plans, and answered any questions; this call did not include a comprehensive medication review.

Patients in the intervention group based on their clinic site received an additional call from clinical pharmacists who conducted a detailed medication reconciliation and assessment; counseled patients on the purpose of their medications, common safety concerns, and how to take each medication; and communicated their findings to the primary care provider. Pharmacists reviewed and compared the patient's discharge summary with the patient's current outpatient medication list prior to their phone call. Patients who received a pharmacist intervention had statistically decreased readmission rates at 7 and 14 days, but not at 30 days post-discharge. Using readmission rates at 14 days, the authors calculated a net savings of $355 per patient, which included pharmacist costs of $45 per reconciliation.

The last study by Smith was a pre-post analysis examining the cost savings of recurrent pharmacist encounters for patients in four federally qualified health centers.[48] Notably, the intervention in this study was not specifically for the post-discharge period. A convenience sample of chronically ill patients with Medicaid was eligible for up to six appointments with a pharmacist at monthly intervals in their primary care office.

Pharmacists conducted a medical chart review before the appointment – for which they were paid—and then followed a stepwise approach at the appointment. They identified drug therapy problems, including inappropriate medications, adverse reactions, difficulty adhering to treatments, and financial barriers, and worked to resolve these problems with the retail pharmacist and prescribers. Using Medicaid claims data from the year before and during the intervention, and accounting for $2-3 per minute for pharmacist's time, the authors determined a net savings of $1,123 per patient in medication claims and $472 per patient in medical, hospital, and emergency department expenses, which included readmissions.

Gray Literature

A search for gray literature revealed a single pre-post analysis examining telemedicine visits by pharmacists for high-risk patients as well as recently discharged patients at safety net clinics. Patients had one or more clinic appointments where they communicated with pharmacists via video regarding medication issues. Pharmacists and patients worked together to decide on follow-up visits, which were occasionally over the phone.

A pre-post analysis of more than 6,000 patients revealed significant improvements compared with the control group: a nearly 40 percent decrease in ED visits and a 23 percent decline in hospitalizations 12 months after enrollment in the program.[49]

Summary

There is mixed peer-reviewed evidence to support the use of outpatient medication management; however, with the inclusion of the gray literature, the evidence for reducing readmissions through pharmacist-led interventions seems to be stronger. These studies had various limitations, including that two were small and none was a randomized controlled trial. Only the Smith study, specifically noted requiring pharmacists to have patient care experience and described a stepwise approach to the patient intervention while the remaining studies simply listed the medication-related issues the pharmacists addressed.

One common theme in these studies is that all the pharmacists seemed to have ready access to patients' electronic medical records. In the two studies that demonstrated the most pronounced decrease in readmissions or cost savings, patients had multiple face-to-face interactions with pharmacists as opposed to just one or two. These two studies were also conducted in safety net patient populations and included patients deemed particularly high risk for readmission.

Several aspects of medication management interventions remain unexplored. These include whether telephone calls are as effective as face-to-face visits, how many patient interactions are necessary, whether nurse- based or pharmacist- based interventions are superior, and how soon after discharge patients should have a visit or phone call. Post-discharge medication management could also be studied and compared in various subpopulations such as patients with low health literacy, poor family support, or other barriers to care. Lastly, descriptions of pharmacist training before the interventions and the specific medication-related issues the pharmacists addressed in each of these interventions might provide insight as to why some programs are more effective than others.

Bundled Care Coordination Interventions

The hospital-based literature suggests that combination interventions are more effective than single interventions. Given the complexity of the issues faced by patients after discharge, it is likely that this pattern would also emerge as a successful strategy for primary care-based interventions. The review of bundled care coordination intervention articles has been divided into several groups given the different lessons they offer about reducing readmissions from the primary care context.

The first group of articles examines bundled care coordination interventions implemented in the context of primary care practices in large academic medical centers. The second group of articles examines bundled care coordination interventions in the context of integrated health care systems. The third group describes care coordination interventions in the context of independent primary care practices, including safety net clinics and rural health clinics. Finally, the last set of articles examines care coordination interventions led by payers.

Interventions Implemented in Large Academic Medical Centers
Peer-Reviewed Literature

Six of the articles examined bundled care coordination interventions in the context of primary care practices affiliated with an academic medical center; see Table 5. The interventions were generally delivered to elderly patients with comorbidities and patients who had been recently hospitalized. The interventions described in the articles reviewed were composed of similar activities, such as a home visit, needs assessment, medication reconciliation, patient education, weekly or monthly monitoring of the patient, and updates to the broader clinical team about the patient's status.

A recent study by Cavanaugh described a primary care-based multidisciplinary follow-up program for patients at high risk for hospital readmission.[50] The nonrandomized controlled trial took place in a National Committee for Quality Assurance (NCQA) level 3 patient-centered medical home with a 15-year history in quality improvement. The program involved a clinic-based care manager who identified, triaged, and scheduled patients for post-discharge primary care follow up and coordinated transportation as necessary. At the post-discharge visit, patients were seen by a clinical pharmacist and a physician. In a retrospective evaluation in which patients who received the program were compared with matched controls who did not, there was a reduction in both 30-day and 90-day readmission rates but no change in ED visit rates. Intervention patients were also seen more quickly than control patients for hospital follow up appointments in their primary care clinic.

Similarly, a pre-post analysis by Farrell, evaluated a transition management intervention led by care managers in clinics with a PCMH model.[51] The intervention involved primary care- based care managers who, in addition to more general care management services, offered specific care transition services. These included identifying and contacting recently discharged patients by telephone and coordinating timely primary care follow-up. The care managers contacted patients (who had a variety of insurance types) and followed a transition management phone questionnaire to assess patients' needs. There was a significant reduction in mean 30-day and 180-day hospital readmission rates.

A larger study by White, evaluated a multicomponent intervention in university-based PCMH practices using a nonrandomized, controlled, pre-post design [52] Four clinics implemented a "culture of continuity" that engaged the primary care team while the patient was hospitalized, during discharge planning, and after discharge. This intervention also included RNs serving as care managers and used techniques such as notifications when patients were admitted and discharged from the hospital; encouragement of primary care "in reach" to hospitalized patients; scheduling of post-discharge appointments within a week of discharge; and prompt communication between the hospitalist and primary care teams.

Readmission rates at 30 days were compared with a group of patients discharged from the same university hospital but who received primary care at 12 different county or community clinics without an ongoing practice transformation. There was a reduction in 30-day readmissions among patients empaneled at clinics that underwent the care redesign program relative to control clinics that did not implement the intervention.

Another study by Balaban evaluated a comprehensive care transition intervention involving both primary care- initiated and hospital- initiated components using a randomized controlled design.[53] Over a 6-month period, patients with medical homes at one of two primary care sites were randomized to the intervention program or control group. The intervention consisted of:

- An educational patient discharge form—in English, Portuguese, or Spanish— prepared by the discharge planning nurse at the time of discharge;

- Electronic transfer of this form to the nurses at the patient's primary care site;

- A scripted phone call upon arrival at home from a primary care-based nurse; and

- Primary care clinician review of the discharge-transfer plan.

The intervention resulted in higher post-discharge primary care follow up rates and higher rates of completion for recommended post-discharge workups.

A study by Stranges used a controlled design with propensity score matching to examine a multidisciplinary transitional care intervention targeting older adults.[54] The program was implemented in a geriatric and PCMH clinic that was part of an academic medical center. Transitional care included a post-discharge call from a pharmacist and a structured post-discharge clinic visit with a medical provider and social worker within a week of discharge. Social workers provided home visits and intensive follow up for up to 3 months for patients as needed. Medical providers also reviewed goals of care with patients and their families. While there was a reduction in 30-day readmissions among intervention versus control patients in the per-protocol analysis, this finding was not seen in the intention to treat analysis.

Gray Literature

Several primary care-based bundled care coordination interventions implemented in affiliation with a large hospital were also identified in the gray literature search:

- One was an ARRA Delivery Systems Grant recipient that examined primary care practice redesign.[55]

- Another one, modeled on the Ambulatory Intensive Care Unit (A-ICU) care model, was highlighted in an AHRQ Service Delivery Innovation Profile.[56] This primary care management program for high-cost, medically complex patients with chronic conditions demonstrated improved self-management behaviors and clinical outcomes, lower utilization, a slowing of cost increases, and higher levels of patient satisfaction.

- Finally, a nurse practitioner-led program called "Health 360" addressed readmissions among complex patients by performing health needs assessments, documenting gaps in care, providing ongoing medication management, and supporting patients throughout the care continuum.[57]

Table 5. Bundled Care Coordination Interventions Implemented in Primary Care Practices Affiliated With Hospitals

Article	Setting	Intervention	Outcomes
Cavanaugh J, Jones C, Embree G, et al. Implementation science workshop: primary care-based multidisciplinary readmission prevention program. J Gen Internal Med 2014;29(5):798-804.	• A primary care internal medicine practice affiliated with the University of North Carolina. • Patients discharged from a select teaching hospital with mixed insurance types (~50% had Medicaid). • Intervention group N=52 patients at one site and control group N=52 matched patients.	• Study design: nonrandomized controlled trial. • Clinic-based care manager identified discharged patients at high risk for readmission and contacted them to schedule a follow-up appointment, ensure transportation, and address other barriers to care. • Standardized 60- minute follow-up visit coordinated by clinical pharmacist practitioner; embedded in this follow-up visits a 20- minute attending physician appointment.	• Decreased readmissions at 30 days: 5% vs. 14% (p=0.023); and 90 days: 10% vs. 24% (p=0.004). • No change in ED visits at 30 and 90 days. • Decreased time to follow up (median number of days): 7 vs. 12 (p=0.001).
Farrell T, Tomoaia-Cotisel A, Scammon, D, et al. Impact of an integrated transition management program in primary care on hospital readmissions. J Healthc Qual 2015;37(1):81-92.*	• Nine University of Utah Community Clinics with trained care managers and a PCMH-based design. • N=118 clinic patients with various insurance types hospitalized at least twice at the University Hospital in the designated study periods.	• Study design: pre-post analysis of readmission rates. • Clinic-based care manager identified discharged patients at high risk for readmission and contacted them to schedule a follow-up appointment, ensure transportation, and address other barriers to care. • Care managers used an 11-item questionnaire that was available to all outpatient care teams.	• Mean readmission rates decreased at 30 days (17.9% vs. 8%; (p=0.01) and at 180 days (52.3% vs. 22%; p=0.01). • Readmission rates were unchanged at 14 days and at 7 days for adults over 65.

White B, Carney P, Flynn J, et al. Reducing hospital readmissions through primary care practice transformation. J Fam Pract 2014;63(2):67-73.	• University-based PCMH primary care clinics
	• Patients discharged from university hospital to one of 16 clinic sites.
	• Intervention group N=685 patients at 4 university clinic sites and control group N=276 patients at 12 community and county primary care clinics.
		• Study designed: non randomized controlled pre-post analysis of readmission rates.
		• Clinic- based transformation of care delivery for hospitalized patients, which included:
		  o Systematic real-time notifications via integrated EMR for admission and discharge.
		  o Arrangement of hospital follow up appointment, pre-discharge.
		  o Team-based care manager (RN) communication with the inpatient team.
		• Development of individualized hospital follow-up workflow with standardized questions.
			• 30 day readmission rates decreased from 27% to 7.1% (p=0.02) a year later in the intervention group and were unchanged in the control group.
			• A linear regression model comparing monthly readmission rates between the two groups indicated a decreasing trend of readmission in the intervention group but not in the control group (p=0.05).

Article	Setting	Intervention	Outcomes
Balaban R, Weissman J, Samuel P, et al. Redefining and redesigning hospital discharge to enhance patient care: a randomized controlled study. J Gen Intern Med 2008;23(8):1228-33.	• A small community teaching hospital in Massachusetts. • Culturally and linguistically diverse patients with PCPs located at two integrated PCMH clinic sites. • Intervention group N=47 patients and control group N=49 patients.	• Study design: randomized controlled design. • Patients randomized to the intervention group received specialized discharge instructions from a discharging nurse; a script-based follow-up call from a nurse at their primary care clinic; and review of their discharge plan by their PCP. • Clinic sites used an EMR that was linked to the hospital.	• No significant difference in 31-day readmission rates between the intervention and control groups (8.5% vs 8.2%; p=0.96). • Aggregate rates of undesirable outcomes (no follow up in 21 days, readmission in 31 days, ED visits in 31 days, and incomplete outpatient workup) were reduced: 25.5% in the intervention group compared with 55.1% of the controls (p=0.003).
Stranges P, Marshall V, Walker P, et al. A multidisciplinary intervention for reducing readmissions among older adults in a patient-centered medical home. Am J Manag Care 2014;21(2):106-13.	• A PCMH and geriatric clinic that was part of a large academic medical center. • Patients 60 or older discharged from the academic hospital to either home or an assisted living facility. • Intervention group N=572 patients scheduled (N=217 completed intervention) and control group N=572 propensity scores matched patients	• Study design: nonrandomized controlled design using propensity score matching . • A multidisciplinary transitional care program that included a post-discharge phone call and medication reconciliation by a pharmacist and follow-up within one week with a social worker and medical provider.	• No difference in 30-day readmission rates among the intention to treat patients and control group (21.0% vs. 17.3%; p=0.133). • Reduction in 30-day readmission rates in the per-protocol patients compared with the control group (10.6% vs. 17.3; p<0.01). • Medication burden and number of high-risk diagnoses were found to be significant predictors of readmission.

∗ *This study was funded by AHRQ.*

Interventions in Integrated Health Care Systems
Peer-Reviewed Literature

Takahashi evaluated a longer and more involved transition program in a primary care academic practice conducted at a large integrated health care system in a controlled study using propensity score matching.[58] A nurse enrolled high-risk patients at the index hospitalization, and an advanced practice clinician conducted a home visit within one to five business days post-discharge.

During the home visit, the provider would conduct medication reconciliation, chronic and acute illness management, patient education in self-care, and contingency planning for changes in clinical status or community liaisons. He or she also would review patient mobility, safety, cognition, and caregiver support. A team of primary care staff, which included an advanced practice clinician, registered nurse, and geriatrician, would review high-risk patients weekly for 1 to 3 months and update the PCP about the patient's status. Patients in this care transition program had a lower 30-day readmission rate compared

with their matched counterparts who were not in this program. But 180-day readmission rates were similar between the two groups.

Another study by Foltz, evaluated a community care team program sponsored by a large health system.[59] The program was designed to support primary care practices in the short-term management of high-risk patients. The teams consisted of a nurse care manager, a behavioral health specialist, a social worker, and a part-time clinical pharmacist. The team focused on care transitions, specifically contacting patients within 48 business hours of hospital discharge to reconcile medications and assist with care coordination activities. An evaluation of enrolled versus unenrolled patients showed a reduction in readmission rates among enrolled patients who received a hospital discharge reconciliation call.

Gray Literature

The gray literature also yielded an instance of a bundled care coordination intervention in the context of an integrated health care system. At Kaiser Permanente Colorado, nurses and licensed clinical social workers in primary care clinics conducted post-discharge phone calls to identify care needs of patients with chronic medical conditions.[60] These care coordinators would then assign patients to one of four service levels:

- Referral to other providers,

- Consultation for services such as medication reconciliation,

- Short-term management—up to 2 months, and

- Long-term management—4 to 6 months or longer.

This care coordination program led to significant reductions in hospitalizations and ED visits, an estimated cost savings of $4 million, increased follow-up care, higher medication compliance, and high physician and patient/family satisfaction.

Table 6. Bundled Care Coordination Interventions Implemented in Primary Care Practices in Integrated Health Care Systems

Article	Setting	Intervention	Outcomes
Takahashi P, Naessens J, Peterson S, et al. Short-term and long- term effectiveness of a post-hospital care transitions program in an older, medically complex population. Healthc (Amst) 2016 Mar;4(1):30-5.	• Three outpatient sites of an academic medical center in Southeastern Minnesota (Mayo Clinic) • Patients >60 with prior hospitalizations and high medical complexity. • Intervention group N=365 patients and control group N=365 propensity score matched patients.	• Study design: nonrandomized controlled design with propensity score matching. • A multidisciplinary care transition program beginning at the index hospitalization with an RN offering a home visit by an advanced clinician 1-5 days after discharge. • During the home visit, the advanced practice clinician conducted medication reconciliation, chronic and acute illness management, and patient education in self-care/contingency planning. • Patients were co-managed by a geriatrician, the PCP, the advanced practice clinician, and a nurse for 1-3 months after discharge.	• Patients in the care transitions program had lower 30-day readmissions compared with matched controls (12.4% vs. 20.1%; p=0.002), but differences in readmission rates were not significantly reduced at 180 days (39.9% vs. 44.8%; p=0.787).
Foltz C, Lawrence S, Biery N, et al. Supporting primary care patient- centered medical homes with community care teams: findings from a pilot study. J of Clin Outcomes Manag 2014; 21(8):352-61.	• Primary care practices in the Lehigh Valley Health System, Pennsylvania. • Practice-level analyses compared patients from the 6 control practices (N=29,881 patients) with 3 intervention practices (N=22,350 patients) that were also transforming toward PCMH.	• Study design: nonrandomized longitudinal design. • Community Care Team (CCT) program: team consisting of nurse care manager, behavioral health specialist, social worker, and pharmacist. Patients were contacted within 48 business hours of hospital discharge to reconcile medications and assist with care coordination activities.	• Significant improvements in quality measures for both sets of practices. • Reductions in the probability of an admission and readmission occurred only for high-risk patients in CCT practices.

Care Transitions Programs in Independent Primary Care Practices
Peer-Reviewed Literature

Although most patients receive care in independent primary care practices, little in the peer-reviewed literature discussed interventions in this setting. The one study conducted in this setting by Boyd described a pilot program called "Guided Care," in which trained nurses collaborated with two to five primary care physicians to deliver services to 50 to 60 multimorbid elderly patients.[61] Once physicians identify patients for the program, nurses:

- Assess patients at home;

- Create an evidence-based care plan with the assistance of their unique EHR;

- Refer the patient to a 15-hour chronic-disease self-management training;

- Monitor patients at least monthly, often by telephone, while offering direct access for questions and concerns on weekdays and alerting the PCP as needed;

- Conduct motivational interviewing to facilitate patient participation in care and adherence to the action plan;

- Coordinate transitions between sites and care providers;

- Offer assessment, 10-hour caregiving course, monthly support group meetings, and telephone consultation to caregivers; and

- Facilitate access to community resources as needed.

The authors note key elements of successful integration of this program, such as having an onsite office for guided care nurses and familiarity with community resources. Although they found improved physician-patient communication among patients who received the intervention, they did not assess care transition outcomes such as readmission rates. The gray literature search also found that this intervention is currently undergoing a randomized control trial at eight sites in Baltimore, as highlighted in an AHRQ Service Delivery Innovation profile.

Table 7. Bundled Care Coordination Interventions Designed for All Primary Care Practices

Article	Setting	Intervention	Outcomes
Boyd CM, Shadmi E, Conwell LJ, et al. A pilot test of the effect of guided care on the quality of primary care experiences for multimorbid older adults. J Gen Intern Med 2008;23(5):536-42.*	• Nonacademic primary care practice in Baltimore. • Patients > 60 with multimorbidity. • Intervention group N=50-60 patients.	• Guided Care (GC) nurse performs a home assessment and creates an evidence-based care plan. In partnership with the primary physician, the nurse: o Monitors and coaches the patient monthly; o Coordinates the patient's transitions between providers and sites of care; o Educates and supports family caregivers; and o Facilitates access to community resources.	• GC participants were more likely than usual care participants to give their care and their primary care physicians high ratings. • GC participants were also more likely to be satisfied with their providers' interactions with chronically ill older patients and their families.

* This study was funded by AHRQ.

Gray Literature

Two examples of care transition programs in independent primary care practices were found in the gray literature. The first, highlighted in an AHRQ Service Delivery Innovation Profile,

was a care coordination program delivered at ChenMed, a physician-led practice of 36 centers six states that offers integrated care to Medicare under capitated contracts.[62] The care coordination activities, focusing on seniors with multiple chronic conditions, included:

- Monthly extended visits with the PCP, offering onsite specialist visits, testing, and medication dispensing;

- Frequent care coordination meetings among providers;

- Care coordination during inpatient stays;

- Referrals to community-based services; and

- Additional programs and infrastructure, such as free transportation and customized electronic medical records with built-in decision support.

Early results seem promising, including high levels of adherence to screenings and care management processes, good blood glucose control among diabetes patients, low use of inpatient services, and high patient satisfaction.

The second example was a hospital- and community-based program at Meritage ACO, a physician-owned and governed Medicare Shared Savings ACO in California.[63] Their ACO used care transition coaching to visit patients at the bedside, care management to educate and engage patients, and care coordination to help eliminate duplication and confusion when patients moved between settings. Their readmission rate for their highest risk patients was just 10.2 percent.

Readmission Reduction Efforts Led by Payers

In some settings, third-party payers may initiate programs to support primary care clinicians in their efforts to improve care coordination at the time of hospital discharge.

Peer-Reviewed Literature

Four articles examined primary care-based readmission reduction efforts led by payers.

Rosenberg evaluated a health plan-initiated program aimed at promoting adoption of the PCMH model by contracted primary care clinics.[64] Specifically, the health plan offered practice sites care management support, actionable data reports, and administrative support and guidance.

The study examined practices within a network that transitioned to PCMH status versus those that did not. Researchers found that readmissions among sites that transitioned to PCMH decreased by 12.5 percent, in contrast with a 0.4 percent increase in readmissions for other practices within the network. However, the findings are limited by confounding factors that likely vary between participating and nonparticipating sites.

Another study by Schraeder, described a similar multicomponent care management program, involving targeted patient outreach after emergency room and hospital visits.[65] The study evaluated a 36-month nonrandomized comparison of elderly patients at high risk for mortality, functional decline, or increased health service use. The intervention included:

- An education series about collaborative care for older adults for primary care staff;

- Assigning a nurse case manager and case assistant to each clinic;

- A home visit and assessment, including development of a longitudinal care plan that was regularly updated;

- Weekly contact during hospitalizations;

- Patient education on community resources, medication management, disease processes, and exacerbation of symptoms;

- Regular calls to patients after physician office visits, ED visits, or hospital admissions; and

- Monthly reports distributed to the collaborative care teams.

There were no significant differences between the treatment and comparison groups for hospitalizations or ED visits, but re-hospitalization was significantly reduced—by 34%—in the treatment group.

The final two studies in this group—by Dubard and Jackson—both examined the North Carolina Community Care Program, which offers transitional care support to primary care practices serving 21,375 Medicaid recipients with complex chronic conditions.[66,67] This statewide population-based transitional care program offered comprehensive medication management, face-to-face self-management education for patients and families, and timely outpatient follow-up with a medical home.

Based on an analysis of Medicaid claims data of patients hospitalized during 2010-2011, patients who received transitional care services through the program experienced a 20 percent lower readmission rate versus matched control patients. Twelve-month readmission rates were also consistently lower, especially among patients within the highest risk stratum.

Table 8. Primary Care-Based Care Transitions Programs Led by Health Plans

Article	Setting	Intervention	Outcomes

Rosenberg C, Peele P, Keyser D, et al. Results from a patient-centered medical home pilot at UPMC Health Plan hold lessons for broader adoption of the model. Health Aff 2012;31(11):2423-31.	• Ten primary care sites transitioning to PCMH programs in Pittsburgh, Pennsylvania; N=23,900 UPMC Health Plan members.	• Study design: analysis of health plan data.
		• Practice-based nurse care manager assigned to high-need patients with chronic conditions to help provide:
		  1. Individually tailored care plans;
		  2. Direct access for members to caregivers outside regular office hours;
		  3. Follow-up with members after ED or hospital visit;
		  4. Rescheduling of missed appointments;
		  5. Alerts to physicians of specific needs and circumstances when members come to the practice;
		  6. Virtual comprehensive care team support for lifestyle concerns, medication reconciliation, and home visits; and
		  7. Data sharing on all UPMC Health Plan members.
			• Patients who received transitional care services through the program experienced a 20% lower rate of readmission vs. matched control patients.

Schraeder C, Fraser C, Clark I, et al. Evaluation of a primary care nurse case management intervention for chronically ill community dwelling older people. J Clin Nurs 2008;17(11c):407-17.	• 58 primary care practices in Illinois.
	• Intervention group N=50-60 patients over age 60.
		• Study design: nonrandomized trial.
		• Intervention included:
		  1. Education series for primary care staff;
		  2. Nurse case manager and case assistant assigned to each primary care clinic;
		  3. Home visit and assessment; care plan development with PCP; monthly visit/contact with patient to review and update plan, monitor health status, provide education on managing health, and arrange health-related services;
		  4. Weekly contact in the case of hospitalization;
		  5. Ongoing patient education on community resources, medication management, and disease processes;
		  6. Regular calls to patient, particularly after physician office visits, ED visits, or hospital admissions;
		  7. Monthly reports distributed to the collaborative care teams.
			• No significant differences between treatment and comparison group in the percentage of patients with hospital stays or ED visits. However, among those hospitalized in the treatment group, the likelihood of being rehospitalized was significantly reduced, by 34% (p = 0.032).
			• Reduced hospital use resulted in cost savings of $106 per patient per month in the treatment group.

Article	Setting	Intervention	Outcomes
Dubard C, Cockerham J, Jackson C. Collaborative accountability for care transitions: the Community Care of North Carolina Transitions Program. N C Med J 2012;73(1):34-40. Jackson C, Trygstad T, DeWalt D, et al. Transitional care cut hospital readmissions for North Carolina Medicaid patients with complex chronic conditions. Health Aff 2013;32(8):1407-15.	• North Carolina, community-based, physician-led program for establishing PCMH for Medicaid patients; N=21,375 Medicaid recipients with complex chronic conditions discharged from a hospital; N=13,476 in intervention group and N=7,899 usual care.	• Study design: North Carolina Medicaid claims analysis. • Broad range of transitional care activities ranging from high to low intensity: 1. Home visit by care manager, 2. Medication review by clinical pharmacist, 3. Telehealth management and service coordination, 4. Patient education; 5. Medication reconciliation, 6. Face-to-face encounter between patient and care manager, and 7. Ongoing follow-up or monitoring by care manager.	• Adjusted readmission rates ~20% lower for Medicaid beneficiaries who received transitional care vs. usual care. • 12-month readmission rates consistently lower for participants in the transitional care group, with greatest impact on patients in the highest risk group.

Gray Literature

Finally, a Robert Wood Johnson article found in the gray literature reported innovative models that redefine nursing to improve care coordination in several States and nationally.[68] It described a program in a Minnesota-based health care organization in which nurses take the lead role in primary care, as well as coordinating post-visit and between-visit care, including post-hospitalization care.

In Pennsylvania, the state offered financial incentives to primary care practices to implement the Wagner Chronic Care Model in the PCMH context. The model relies on nurses to provide care management. As part of Vermont's Blueprint for Health programs, nurse care coordinators collaborate with social workers, behavioral health counselors, and others to make sure that patients receive preventive and coordinated care.

Last, the article describes an effort by the U.S. Department of Veterans Affairs to provide veterans with a five-person Patient-Aligned Care Team (PACT) that delivers continuous, coordinated care over time. So far, the program has shown significant reductions in emergency and urgent care visits, as well as acute-care hospital admissions.

Summary

Based on this search, care coordination interventions led by third-party payers in an effort to support primary care practices in coordinating care at the time of hospital discharge may be an effective approach to improving care and reducing avoidable readmissions. This approach may be most relevant in settings in which small, independent primary care practices lack the infrastructure and business case to engage in structured care transition programs.

The Patient-Centered Medical Home and Care Coordination

The PCMH is a key framework driving primary care transformation including care coordination activities that help reduce avoidable readmissions. Although many of the preceding articles about care coordination interventions were conducted in the context of the PCMH framework, two articles examined the efficacy of the PCMH model itself.

In the Hearld article, there was a focus on the correlation between PCMH capacity—the ability to offer services that represent component parts of the PCMH such as patient registry and extended access—and timeliness of post-hospital follow-up visit.[69] Overall, there was no significant association between PCMH capacity and early follow-up, but a subgroup of patients with chronic conditions did receive earlier follow-up.

Wagner examined the utility of a care coordination model in improving coordination among participating practices in the Safety Net Medical Home Initiative (SNMHI).[70] The SNMHI was a Commonwealth Fund-sponsored project designed to develop and test a replicable model for supporting acceleration of PCMH transformation among 65 safety net practices in five states. Practices included federally qualified health centers, rural health clinics, and other safety net providers.

The PCMH model included eight change concepts, one of which was care coordination. Results showed that fidelity to the Care Coordination Model elements were positively correlated with timely post-emergency room and hospital discharge follow-up.

Summary

Although data are limited, evidence suggests that primary care practices may be more effective in improving care coordination during care transitions when these efforts are embedded within a PCMH framework.

Integrating Hospital- and Primary Care-Based Efforts

As described earlier, the literature has identified a number of barriers to communication and coordination between hospitals and PCPs. Several of these articles also described recommendations for sharing or assigning accountability during the care transition process.

Peer-Reviewed Literature

In the section about challenges to care coordination, several articles focused on issues associated with the disconnect between hospitals and primary care. For instance, Davis, emphasized the importance of communication between primary care clinicians and hospitalists in improving transitional care, while acknowledging that hospitalists and PCPs may have differing views about how such communication should occur.[22] They highlighted the need for communitywide discussions to agree on expectations, and, ideally, the development of a "community contract" in which responsibilities are assigned for each transitional care element.

Shih analyzed the communication between PCPs and home care nurses in the post-discharge period.[24] The study reported on finding a lack of relationships between PCPs and home care nurses, inadequate articulation of responsibilities, and different perspectives between these two provider types in the reasons for readmission. Their research supported the need for explicit agreement on roles and responsibilities among all providers caring for the patient.

Finally, Jones conducted separate focus groups with hospitalists and PCPs on the challenges in care transitions in the post-discharge period.[23] They found that hospitalists and PCPs identified many similar challenges and that the differences noted were typically issues that clinicians in other settings were unaware of. They further identified a lack of accountability for pending tests and for home health services initiated by inpatient providers. Possible solutions recommended included creating formal systems to establish accountability between inpatient and outpatient providers for tests, imaging, and home health care.

A comprehensive review article by Tang outlined a prototype of an effective partnership between hospital and primary care-led teams in managing care transitions.[71] Specifically, the model assigned accountability to primary care providers and clinic staff for:

- Calling the patient within 72 hours of discharge,

- Ensuring additional follow-up appointments with the PCP as needed,

- Coordinating care,

- Providing access when new symptoms arise,

- Tracking readmission rates, and

- Monitoring frequently admitted patients.

Primary care clinics and hospitals must jointly be accountable for ensuring mechanisms for appropriate communication and notifications when patients are hospitalized. Tang emphasized the importance of payment reform for primary care clinics seeking to assume these expanded roles. The article cited ACOs and recently enacted Medicare payment codes for care coordination as essential to the expansion of primary care's role in improving care transitions.

In another article, Jacquin described key components to transform the care delivery model across the continuum to succeed under value-based payment models: managing care across the continuum, reducing readmissions for all diagnoses, building and supporting the PCMH model, and achieving clinical integration.[72] Particularly, she described sets of tasks across the continuum – such as pre-acute care or readmission avoidance settings, acute care/hospital setting, and post-acute care—that different parties should be responsible for. Models that explicitly describe such roles across the continuum of care and how they interface with one another can help improve efficiency and quality of care.

Summary

Expert recommendations consistently highlight the need for clear accountability for primary care clinicians and in the care transitions process, as well as the need to explicitly define primary care responsibilities. Advanced payment models in which primary care clinicians accept some of the risk for patients may help stimulate the necessary discussions for defining this accountability.

Tools and Resources

The research on primary care-based readmissions efforts is still emerging, but the evidence reviewed suggests that primary care can play an important role in care transitions; see Table 9 which lists five tools developed to help primary care clinics improve care transitions.

The first resource is a Web page by Maine Quality Counts that offers a list of care transition tools and resources largely developed from hospital-based literature. It includes information from a variety of sources on care transitions for primary care providers and a sample follow-up telephone call script.[73] The second is a checklist developed by Eric Coleman for the California Healthcare Foundation to identify tasks that should be completed to reduce readmissions prior to, during, and at the conclusion of the primary care follow-up visit; this checklist includes tasks such as review discharge summary and provide instructions for seeking after-hours care.[4]

The remaining three tools are comprehensive guides on care coordination and transitional care activities. The first is a toolkit, funded by AHRQ, called the Primary Care Transitions Change Package, which was developed by the North Carolina IMPACT Transitional Care Collaborative.[74] The 102-page toolkit describes a quality improvement framework, patient risk stratification, testing of the post-discharge visit protocol, medication reconciliation, and ways to connect patients with community resources, among many other related issues.

Second, the MacColl Institute for Healthcare Innovation developed a Change Package for Better Care Coordination.[75] The toolkit introduces a Care Coordination Model based on key concepts that contribute to successful referrals and care transitions. The toolkit then describes six key changes that support the model and identifies resources to facilitate each change, with case studies for illustration and an index of the recommended tools and resources.

Lastly, the Patient Centered Primary Care Collaborative developed a resource called the *Guide to Care Coordination in the Medical Home*.[76] The guide includes expert articles offering insight into what is known and tested about care coordination and is designed to offer a roadmap for new and emerging programs. The guide also contains case examples representing a range of programs at various stages of implementation.

These tools and resources offer assistance to primary care providers interested in reducing avoidable admissions and offer a foundation for future research and resulting guidance on primary care-based readmission reduction initiatives. Testing these tools and resources over time and in different settings will greatly inform the field.

Table 9. Tools and Resources

Author and Tool or Resource	Intended Audience	Purpose	Description
Maine Quality Counts. Care Transitions Tools & Resources.	Hospital-based tools, but can be applied to a primary care setting	Help practices and providers promote safe and effective care transitions and reduce avoidable readmissions	A Web page of tools for providers and practices: 1. Care transitions roadmap; 2. RWJF Care Transitions tools and resources for reducing inappropriate ED use; 3. HARMS-8 tool for assessing nonmedical risks; 4. Project BOOST post-discharge follow-up call script; 5. Institute for Healthcare Improvement post-discharge checkup checklist; and 6. INTERACT Tool
Coleman E. California Healthcare Foundation. The Post-Hospital Follow-Up Visit: A Physician Checklist to Reduce Readmissions.	Primary care setting	Fill the literature gap regarding post-hospital best practices for primary care providers	A checklist covering the before, during, and after of the primary care visit for readmission risk awareness
DeWalt D. Cecil G. Sheps Center for Health Services Research and Community Care North Carolina. Primary Care Transitions Change Package.*	Primary care setting	Provide quick reference to rethinking practice design, implementing low-risk strategies, and integrating care transitions work into their practice	A quality improvement toolkit that contains methods and tools to address the following key areas: 1. Provide timely access to care following a hospitalization, 2. Prepare for post-discharge visits, 3. Conduct a thorough post-discharge visit, and 4. Communicate and coordinate an on-going care plan.
Wagner E, Schaefer J, Horner K, et al. MacColl Institute for Healthcare Innovation. Reducing Care Fragmentation: A Toolkit for Coordinating Care.	Designed for clinics, practices, and health systems focused on improving care coordination	Provide guidance around care coordination to ensure successful referrals and transitions	A guide that describes four aspects of reducing care fragmentation—accountability, patient support, relationships and agreements, and connectivity—and corresponding tools for implementation and example case studies
Patient Centered Primary Care Collaborative (PCPCC). Care Coordination in the Medical Home.	Primary care setting in the process of implementing PCMH	Explore the role and issues associated with care coordination and the medical home	A report that offers: 1. Expert-authored articles on the definition, role, and function of care coordination, as well as tools for implementation and measurement and monitoring of its effectiveness 2. Case examples 3. Summary of survey responses from select practices

∗ *This resource was funded by AHRQ.*

Discussion

This review summarized the literature on barriers and challenges from the primary care perspective of caring for patients during the vulnerable time after hospital discharge. The review also covered the literature on primary care interventions aimed at improving care during the post-discharge period. This analysis adds to the existing literature on hospital-based efforts to improve the discharge process for patients and to reduce the rate of avoidable readmissions.

The literature suggests that primary care providers face several key barriers and challenges to caring appropriately for their patients at the time of, and immediately after, hospital discharge. Most notably, they face:

- System challenges, including a lack of reimbursement options for compensating peri-discharge care coordination;

- Organizational challenges, including suboptimal communication mechanisms between the hospital and ambulatory environments;

- Provider-related challenges, including a lack of time and support to communicate with inpatient providers and understand medication and other changes that occurred during hospitalization; and

- Patient-related challenges, including financial barriers to receiving necessary post-discharge care, inadequate physical and emotional support to comply with the post-discharge care plan, and lack of social support to address nonmedical needs such as housing and transportation.

While the extent of these challenges varies by setting—with integrated delivery systems less burdened by some of these challenges and complex environments with numerous hospitals and small practices more burdened—all systems face these challenges to some degree. Patient-related challenges also vary considerably and are most pronounced among lower income vulnerable populations and among frail, elderly, and chronically ill patients. Regardless of the patient population, patients are vulnerable during the peri-discharge period and may benefit from targeted, specialized support services.

Overall, this review has found emerging literature on primary care-based care transition programs, but this literature is less robust than the literature on hospital-based programs. There have been few high-quality controlled studies of interventions aimed at addressing and overcoming the challenges and barriers listed above. Moreover, the types of interventions that have been studied vary in nature and in the settings where they have been conducted. While many of these shortcomings are apparent in the literature on hospital-based care transition programs,[11] they appear even more pronounced among primary care-based programs.

Nonetheless, these findings highlight the following general themes with respect to the effectiveness of primary care-based care transition strategies. First, as is the case for hospital-based interventions, the most encouraging approaches seem to involve

multicomponent bundled interventions aimed at addressing multiple challenges that patients and providers face. Several controlled studies of bundled care coordination interventions described in this review found substantial improvements in several outcomes, including readmission rates. Common activities included in successful bundled interventions involved care coordination efforts, medication management, post-discharge telephonic outreach, and patient education.

Similar to the literature on hospital-based interventions, the studies identified that primarily included only a single focused intervention typically failed to demonstrate a meaningful impact on patient outcomes such as readmission reduction. For example, the data suggest that coordinating post-discharge primary care visits for patients, without other concurrent care coordination efforts, is unlikely to lower readmission rates. Presumably, many of the factors leading to readmissions cannot be addressed through any single effort alone; however, narrow care coordination efforts may affect other outcomes, including the experience of patients and frontline providers. The notable exception to this finding may be automated alerts notifying primary care clinicians when their patients are admitted and discharged, which may provide modest benefits in isolation.

A second theme is that many of the most successful primary care-initiated care transition programs occurred within the context of more general primary care transformation efforts guided—either explicitly or implicitly—by a PCMH framework aimed at improving care for patients longitudinally. Importantly, however, these general transformation efforts may not require official PCMH certification to be successful. This finding contrasts with most hospital-based care transition efforts that target care transitions but may not necessarily be part of a larger hospital-based care redesign effort.

It is possible that broader PCMH-guided transformation efforts may provide an anchor for effectively implementing and sustaining primary care-initiated care transition programs. Indeed, care coordination resources, such as case management staff, may be leveraged for multiple purposes, driving efficiencies. Similarly, care transition efforts may synergize with more general efforts aimed at promoting continuity, quality improvement, access, and holistic care that are fundamental to the PCMH framework.

A third theme is that the approach to primary care-based PCMH interventions may vary depending on the setting. Transition efforts are facilitated by clinical and financial integration between clinics and hospitals. For example, independent community primary care practices face particular challenges coordinating care for patients following hospitalization because they are not affiliated with hospitals or other networks that can assist with or facilitate coordination efforts during care transitions. In such settings, primary care clinics that lack the scale to hire their own dedicated care coordination staff may attempt to leverage community resources, such as those available through third-party payers or hospitals, to support their patients. These networks may offer dedicated care management staff to track hospitalized patients and ensure appropriate information from the hospital is communicated to primary care clinicians.

In addition, in fully integrated care delivery systems, health information exchange and communication between the inpatient and primary care settings are greatly facilitated.

Nevertheless, there remain important needs to ensure effective transitions for patients admitted to out-of-network hospitals. Even within these systems, communication during care transitions is critical. As noted above, a key component of the successful Group Health PCMH demonstration, which took place at an integrated delivery system, involved protocoled outreach to patients in the peri-discharge period.

A fourth theme is that many of the primary care-based interventions reviewed were funded by grants or other temporary funding mechanisms. For example, many of the staff members used in these interventions—nurses, pharmacists, and care managers—did not provide directly reimbursable services. Thus, additional clinics could not initiate these programs without external support, raising important concerns about the sustainability of these programs.

In some settings, primary care clinics are part of organizations bearing financial risk for their population. As such, primary care-based transition programs may be justified by value added either in: experiential such as improvements in patient experience or quality scores; financial such as cost avoidance outcomes; or both. However, many primary care providers in the United States do not work within organizations bearing direct financial risk, and expenditures on interventions aimed at improving care coordination at the time of hospital discharge may not reap financial returns. Thus, in addition to identifying optimal primary care approaches for improving care transitions, the resources to support such activities need to be taken into consideration.

Several articles examined in the section about readmission reduction efforts led by payers demonstrate the feasibility of implementing care transition programs on a large scale in a sustainable way. There are also emerging opportunities through Medicare and some commercial payers to reimburse for care management services, including those connected to care transitions.[77]

Finally, it is worth noting that while general themes emerged, the outcomes of the programs described were not universally predictable based on definable patterns. Specifically, some programs succeeded despite being narrowly focused while others did not achieve the intended outcomes even though they were broad in scope and took place within a favorable setting.

This finding is common among health service interventions and may relate to intangible factors such as the overarching culture of a particular organization.[78] It also may explain, in part, why programs initiated within the context of more general primary care transformation efforts guided by a PCMH framework tend to be more successful; the presence of a PCMH initiative may be a marker of a favorable culture associated with programmatic success. Thus, although the above-described themes can help guide primary care organizations as they implement care transition programs, intangible factors also may influence success.

Conclusions

The research findings from this environmental scan have implications for primary care clinic and health system leaders, policymakers, and researchers.

First, for clinic and health system leaders, the existing literature suggests some important lessons and strategies for successful care transition models. The Tools and Resources section lists toolkits and other documents that provide practical guidance for those hoping to develop programs for improving care transitions for their populations.

Moreover, multifaceted, primary care-based efforts might be most effective if they align with hospital-based care transition programs. Efforts to link ambulatory and hospital strategies for supporting care transitions will likely depend on efforts to build cooperative relationships with hospitals in their communities. To promote such relationships, primary care and hospital leaders might collaborate to define responsibilities to facilitate accountability for the entire care transition process. This collaboration might take the form of formal agreements between primary care clinics and hospitals in their communities.[79,80] And the development of agreements may need some additional supports such as shared savings programs, managed care contracts, and other efforts to align clinic and hospital financial incentives.

For policymakers, these findings highlight the importance of broadly supporting investment in primary care. Previous research has shown that health systems with strong primary care infrastructure perform better both with respect to the quality and efficiency of care delivery than those with poorly developed systems of primary care.[19] These findings confirm that the most successful and sustainable care transition initiatives are embedded within strong primary care systems.[81]

These findings also highlight the value of both clinical and financial integration between primary care practices and hospitals in facilitating care transition efforts. As noted above, financial arrangements for alignment in non-integrated settings and financial arrangements that align primary care and hospital incentives, may facilitate this integration. The importance of policymakers in this process cannot be overlooked if sustainable care transition programs are to be broadly instituted.

In addition, the environmental scan's findings highlight the need for further development of the evidence base with respect to primary-based care transition interventions. Analogous to the research on hospital-based programs, there needs to be more methodologically rigorous studies examining the primary care setting. Additional projects on care transitions in independent primary care practice settings should be undertaken by researchers since most of the studies identified were conducted in partially or fully integrated delivery systems and academic health systems.

Researchers should consider designing low-cost interventions that build on existing infrastructure, such as existing care coordination staff within the ambulatory environment, as well as on integrating efforts with existing hospital-based care transition efforts. To the extent possible, patients should be involved in designing interventions to ensure that programs are designed around patients' goals. It will be critical not simply to develop general approaches for improving care transitions from the primary care perspective, but also to support the development of best practices for implementing these approaches in complex real-world settings.

Another critical issue resulting from the scan is the recognition that: 1) no primary care practice workflow is the same;[82] and 2) care coordination activities have many interdependencies both in and out of the primary care practice setting.[83] Furthermore, it also demonstrates the potential of primary care-led interventions, particularly those embedded within a strong framework, to improve care for patients being discharged particularly when it supplements existing literature. Finally, the findings of this environmental scan provide an impetus for further examination the benefits of coordination of transitional care interventions between hospitals, primary care, and communities.

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